the congestion mitigation and air quality improvement program

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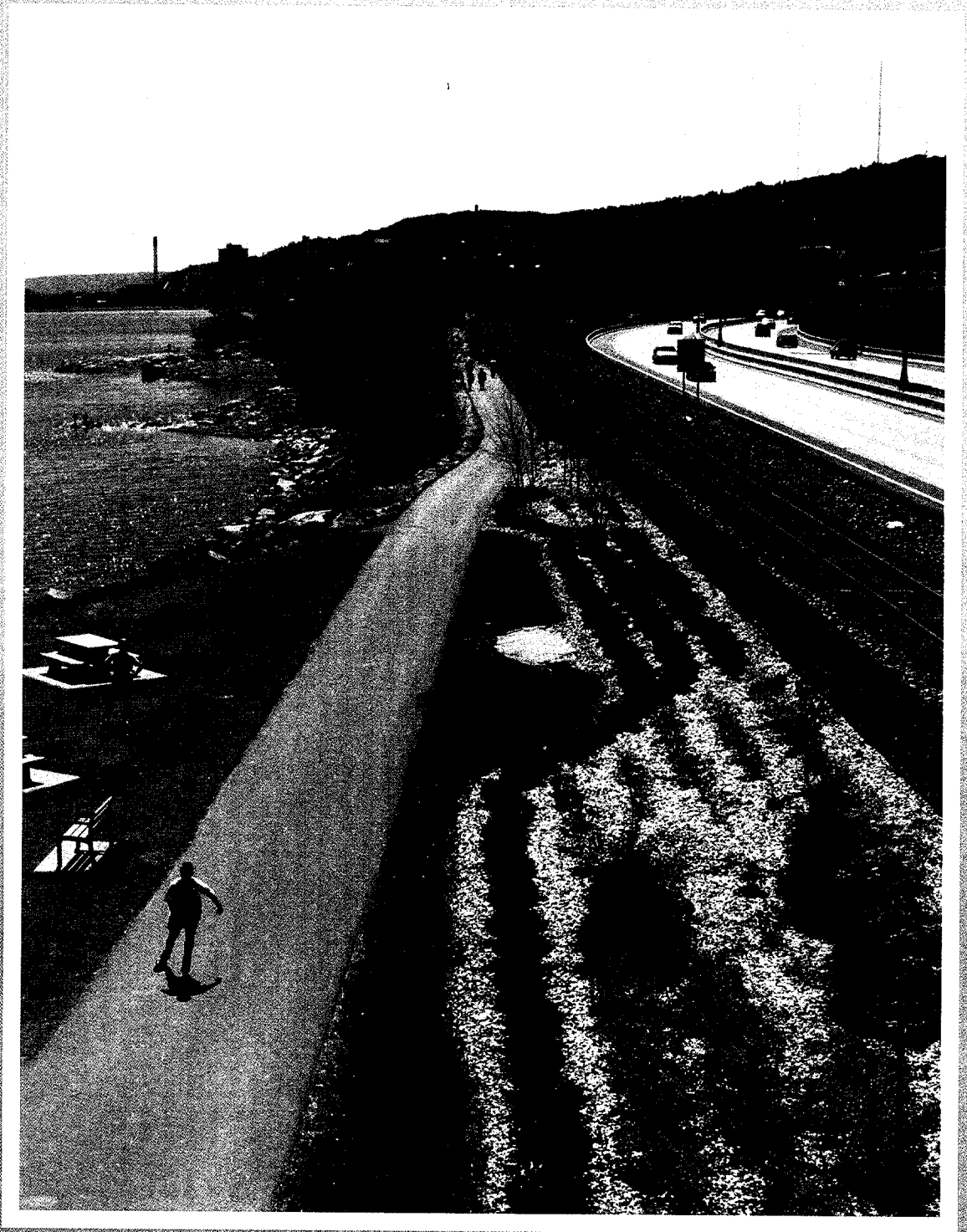


U.S. Department of Transportation
Federal Highway Administration
Federal Transit Administration

Our **vision** is to create the world's **safest**, most efficient and **effective intermodal transportation** system with the **active** participation and **support** of our **partners** throughout government and in the private sector.

Contents

Introduction

Clean air is an important part of a healthy environment. Unfortunately, many industrial and transportation activities that sustain our economy can also produce air pollutant emissions as by-products, degrading our air quality. Safeguarding our air from such contamination is an important priority of the U.S. Department of Transportation (U.S. DOT), the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA).

The FHWA and FTA, in partnership with the States, Metropolitan Planning Organizations (MPOs), and local and private transportation entities, are preparing for the future. Our overall vision is to create the world's safest, most efficient and effective intermodal transportation system for the American people--a transportation system that provides access to everyone within and beyond their community; where crashes, delays, and congestion are significantly reduced; where freight moves easily and at the lowest costs; where roads protect ecosystems and travel on our roadways does not degrade the quality of the air; where pedestrians and bicyclists are accommodated; and

Clean air is an important part of a healthy environment.

where essential transportation services are restored immediately after natural disasters and emergencies.

The FHWA and FTA goal to reduce delays on the transportation system and to protect and enhance the natural environment and communities affected by transportation is greatly advanced by the Congestion Mitigation and Air Quality Improvement Program (CMAQ). The FHWA and FTA recognize that we cannot achieve our goals and objectives without the active participation and support of our partners throughout government and in the private sector. That is why we are bringing this information on the CMAQ Program to our stakeholders.

This brochure describes the CMAQ Program, a transporation air quality improvement program. It contains background and resource material for transportation planners, project applicants, environmental stewards and the general public. It includes information about application procedures, eligible projects and contacts for more information.

The FHWA and FTA goal to reduce delays on the transportation system and to protect and enhance the natural environment and communities affected by transportation is greatly advanced by the Congestion Mitigation and Air Quality Improvement Program (CMAQ).

The Problem

Air Pollution and Traffic Congestion

Since the 1950s, we have known that vehicle exhaust fumes play a major role in the deterioration of air quality in urban areas. This knowledge led to widespread State and Federal regulatory activity, which eventually resulted in the passage of the modern Clean Air Act (CAA) in 1970.

The CAA gives the U.S. Environmental Protection Agency (EPA) the responsibility and legal authority to control air pollution by setting limits on pollution from stationary, area, and mobile sources of emissions. Federal standards, known as National Ambient Air Quality Standards (NAAQS), are required to be set at levels that protect human health. There are currently NAAQS for six pollutants. Those for which transportation sources are significant include carbon monoxide, particulate matter, and ozone. The most persistent pollution problem is ground level ozone, which is not emitted directly but is produced in the air during a complex photochemical reaction involving volatile organic compounds (VOCs) and oxides of nitrogen (NOx) contained in automobile exhaust emissions and other similar gasses.

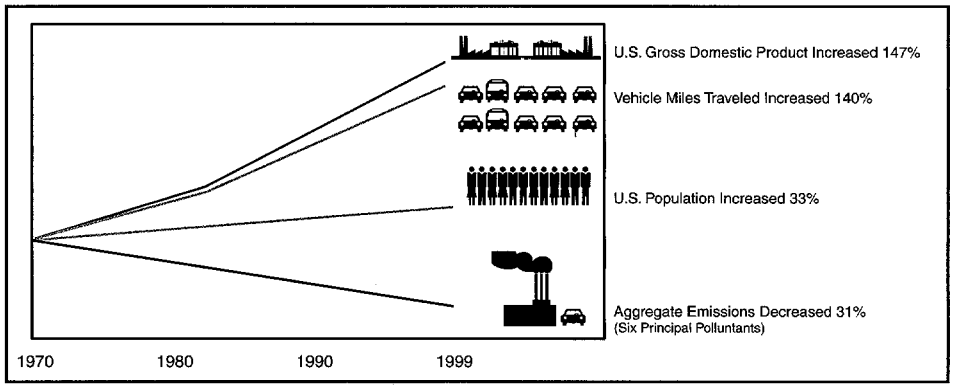


Figure 1. Comparison of Growth Areas and Emission Trends

	Percent Decrease in Concentrations (1989-1998)	Percent Decrease in Emissions (1989-1998)
CO	-39	-24
O_3	-4 (1 hour)	-26 (VOC) +1 (NO_x)
PM_{10}	-25	-30

The air is much cleaner than it was in 1970 even though further progress is necessary. For example, the EPA estimates that from 1989-1998 national emissions from mobile sources for carbon monoxide (CO) decreased 24 percent, 26 percent for VOCs and 30 percent for particulate matter (PM) less than 10 microns in size. These dramatic emission reductions occurred simultaneously with significant increases in economic growth and

Figure 2. Decrease in National Concentrations and National On-Road Mobile Source Emissions

Sources: Figures 1 - 3 – U.S. EPA. *Latest Findings on National Air Quality: 1999 Status and Trends,* August 2000. EPA-454/F-00-002 and U.S. EPA. *National Air Quality and Emissions Trends Report, 1998,* March 2000, EPA 454/R-00-003.

population. Despite substantial progress in reducing emissions, the impact of mobile source air pollution continues to be large. EPA estimates that over 5,000 tons of VOCs from transportation sources were emitted in 1999 and that approximately 62 million people were living in areas that do not meet the health-based standards.

Fine particulate matter, or $PM_{2.5}$, is defined as particles less than 2.5 microns in size. This pollutant causes adverse health effects by depositing in the lungs where it interferes with the respiratory process. The health risk from an inhaled dose of PM may depend on the size, composition, and concentration of the particulate. Combustion sources, including on-road vehicles, are thought to be significant to overall pollution levels of PM 2.5.

Large and densely populated metropolitan areas experience increased traffic congestion problems. The cost of traffic congestion to travelers is measured in hours of delay and wasted fuel. Travelers in the nation's 68 largest metropolitan areas spent over $72 billion in hours of lost time and wasted fuel in 1999. Between 1982 to 1997 the annual hours of delay per driver in the country's largest metropolitan areas increased by 125 percent, and in the small urban areas, the average increase was 400 percent.[1] Figure 4 displays the congestion increases experienced in many urban areas throughout the country.[2]

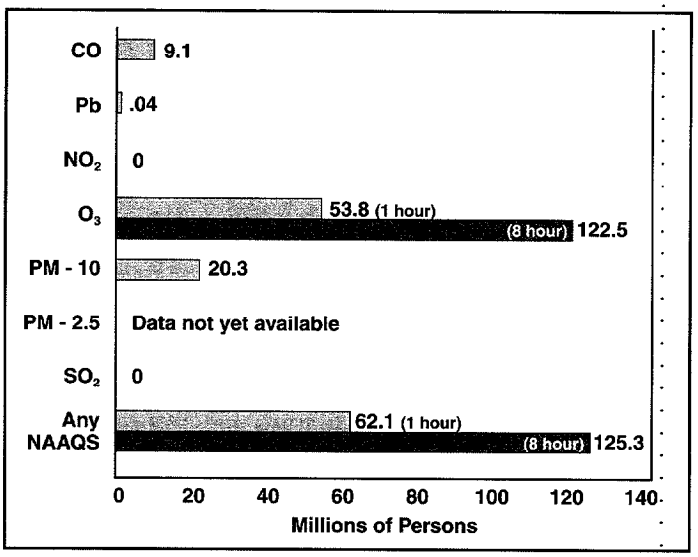


Figure 3. Number of People Living in Countries with Air Quality Concentrations Above the Level of the NAAQS in 1999

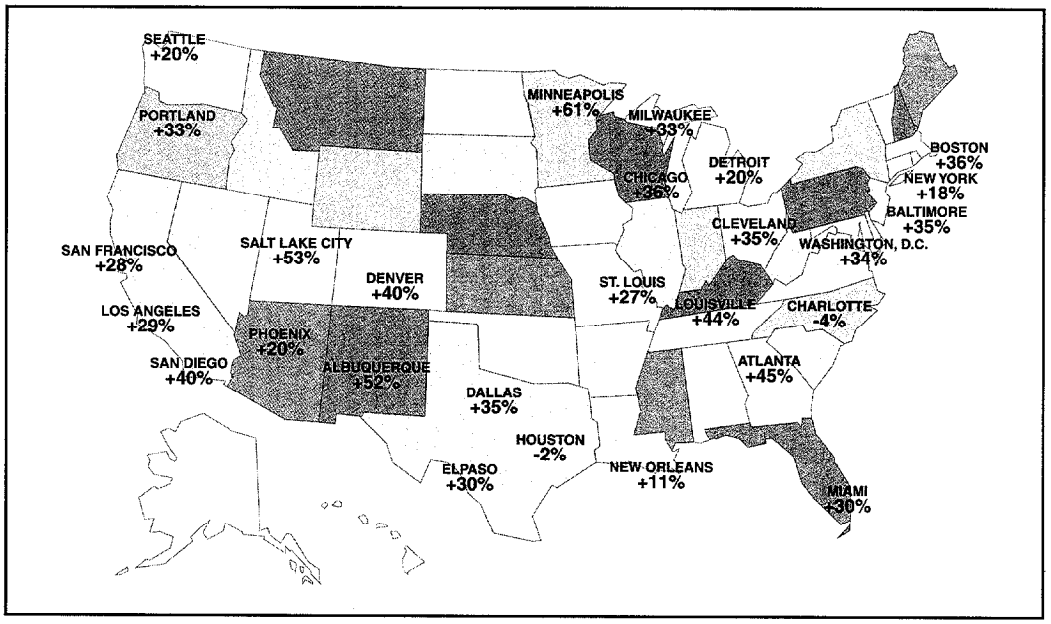


Figure 4. Percentage Change in Urban Congestion, 1982 to 1997

[1 & 2] Texas Transportation Institute. *1999 Annual Mobility Report,* Appendix A-4

The Response

The Congestion Mitigation and Air Quality Improvement Program

In 1990, Congress amended the Clean Air Act to accelerate America's efforts to attain the NAAQS. The amendments required further reductions in the amount of permissible tailpipe emissions, initiated more stringent control measures in areas that still failed to attain the NAAQS (nonattainment areas), and provided for a stronger, more rigorous linkage between transportation and air quality planning. The following year, Congress adopted the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. This law authorized the Congestion Mitigation and Air Quality Improvement Program (CMAQ) to provide funding for surface transportation and other related projects that contribute to air quality improvements and congestion mitigation. The CAA amendments, ISTEA and the CMAQ program together were intended to realign the focus of transportation planning toward a more inclusive, environmentally-sensitive, and multimodal approach to addressing transportation problems.

CMAQ and Air Quality

The main goal of the CMAQ Program is to fund transportation projects that reduce emissions in nonattainment and maintenance areas. Using State Departments of Transportation (State DOTs) estimates in 1997, total emissions reductions nationwide for CMAQ-funded projects were 170 tons per day for VOC and 430 tons per day for CO. While small in comparison to the reductions needed to attain the NAAQS, CMAQ funding has been proven to assist State DOTs and MPOs to meet their emission reduction requirements. Typically, under ISTEA, 89 percent of CMAQ-funded activities result in an estimated benefit of fewer than 100 kg/day or less while a much smaller percentage show significantly greater benefits. Figure 5 shows the distribution of expected VOC reductions for CMAQ-funded projects nationwide for FY 1997.

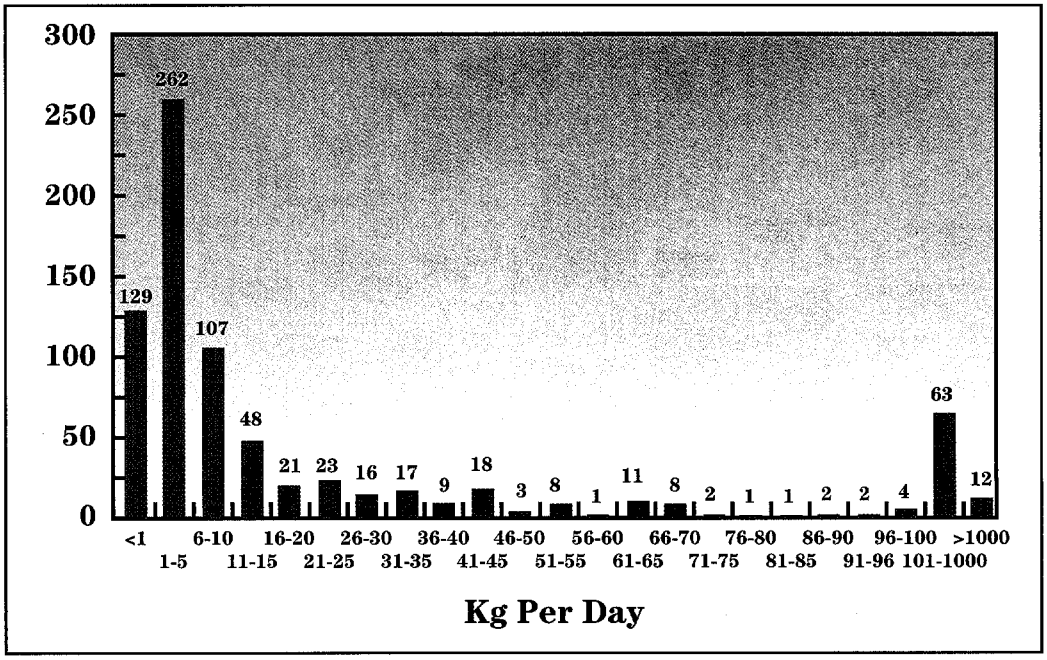


Figure 5. Expected Emission Reductions (VOC) 1997

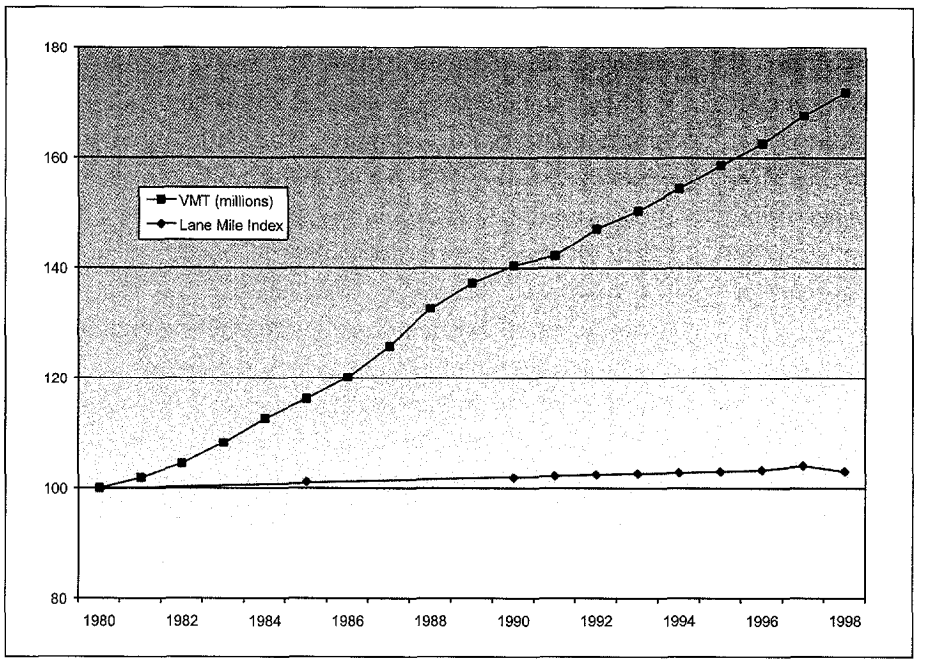


Figure 6[4]. VMT Versus Lane Mileage

The most effective CMAQ-funded projects tend to be large in scope and those that directly affect vehicle emissions, for example, Inspection and Maintenance VOC reductions range from 2 to 17 tons per day.[3]

CMAQ and Congestion Relief

Congestion mitigation is also a goal of the CMAQ Program. Congestion relief can contribute to improvements in air quality by reducing travel delays, engine idle time and unproductive fuel consumption. And while emissions are generally being reduced nationally, most metropolitan areas are experiencing increases in congestion. Over the past twenty-five years, vehicle miles traveled (VMT) have more than doubled, while lane miles have increased slightly. (See Figure 6). This means that people are driving more and over a relatively static surface transportation system which is causing increased congestion.

Reductions in traffic congestion may decrease mobile source emissions as well as improve local economic competitiveness and productivity. However, given our current investment patterns, increasing levels of congestion are likely in the coming years. Our current course of runaway congestion is ---less and less--- a publicly acceptable option. In addition to the $72 billion in lost time and wasted fuel, businesses located in areas with major travel delays face added costs associated with production delays, delivery difficulties, and diminished access to clients. While one alternative is to fund additional road construction to keep pace with traffic growth, this requires large capital expenditures, as well as other social and environmental costs that many communities are increasingly unwilling to accept.

Furthermore, there just may not be enough land where the need is greatest in dense urban cores. Part of the solution for these areas is to greatly improve the efficiency of the entire transportation network by increasing vehicle occupancy through better transit services, ridesharing and other demand management strategies; and managing our road systems better through Intelligent Transportation Systems and other traffic flow improvements. These improvements offer the mobility choices to reduce congestion and emissions, and CMAQ funding can help make these a reality.[5]

The CMAQ program is targeted at the areas of the country with the most severe air quality problems, which unsurprisingly represent the nation's largest

[3] Source: FHWA, *1997 CMAQ Annual Report.*

[4] Sources: FHWA. *Highway Statistics Summary to 1995, Highway Statistics Annual Reports 1996-1998;*
FHWA/FTA. *1997 Status of the Nation's Surface Transportation System;*
BTS. *Transportation Statistics Annual Report 1998*

[5] Source: Texas Transportation Institute. *1999 Annual Mobility Report.*

metropolitan areas. These areas are of tremendous importance. They account for 34 percent of the population, 45 percent of the national Gross Domestic Product, 34 percent of the employment, and comprise just 3 percent of the land area. If CMAQ funding were sub-allocated to these areas according to the federal apportionment formula applied to the States, they would receive more than 57 percent of all CMAQ funds nationally (see Table 1).

Table 1 [6]

Federal Fiscal Year 1999 CMAQ Apportionments for the Country's 12 Largest Metropolitan Areas*

Metropolitan Area Name	Total CMAQ Funds for Metro Area
New York City (tri-State area)	$ 182.5 M
Los Angeles	$ 158.7 M
Chicago	$ 68.7 M
San Francisco	$ 34.0 M
Philadelphia (tri-State area)	$ 56.2 M
Detroit	$ 24.5 M
Boston	$ 50.0 M
Washington DC (tri-State area)	$ 59.7 M
Dallas - Ft. Worth	$ 31.3 M
Houston	$ 35.6 M
Miami	$ 23.0 M
Atlanta	$ 24.8 M
Total	$ 749.2 M
Percent of Total Apportionment	57.2%

*If suballocated according to the Federal apportionment formula

Reducing congestion is an important goal for all metropolitan areas and CMAQ plays a role in both large and small metropolitan areas in slowing the growth of congestion, reducing emissions, and maintaining economically viable and mobile communities.

CMAQ and Livability

Smog-free urban areas with good mobility underpin sustainable development goals, and a key benefit of CMAQ-funded projects is improved livability in an urban area. Areas with significant traffic congestion and bad air pollution are consistently rated poorly by the affected populations. Congestion is cited as the cause of "road rage" and other anti-social behavior. By addressing these key needs, CMAQ funding can help an area achieve a more livable environment for its inhabitants. Other quality of life benefits can also result from CMAQ funded projects. Bicycle and pedestrian improvements can make urban life much more enjoyable.

In addition to these benefits, the CMAQ Program has many indirect benefits such as including new stakeholders in transportation decisions, fostering project innovation, enhancing intermodal planning, and promoting savings in infrastructure investment. The future success of the CMAQ Program relies upon the continued participation of a diverse group of stakeholders. This diversity results in positive benefits for communities throughout the United States, because air quality decisions are subjected to a wider variety of input from representatives throughout communities and the public.

The Scale of CMAQ Projects

CMAQ funding will not "solve" an area's air quality or congestion problems. Nor can it alleviate a great many urban problems, and dramatically improve an area's livability. It is one piece of a larger mosaic that can help in specific transportation corridors. For example, about $109 billion was spent by all levels of government on highway and transit programs in 1995. CMAQ funding available to the States in that year was only about $1 billion, or just 0.9 percent. Even single, albeit major, transportation infrastructure projects can cost in the billions of dollars, far exceeding total CMAQ funding.

As instructive as this comparison is to give a relative sense of scale, the proper comparison is not to the amount spent each year to maintain and improve the transportation network but to the total value of the network. While reliable estimates are not available, that figure is generally estimated to be in the trillions of dollars. When viewed in this context, CMAQ funding can only be viewed as providing incremental improvements to such a vast network. The appropriate way to view the potential of the CMAQ program is at the project or corridor level where the benefits of a single project can make a difference.

[6] Source: FHWA.

What's New

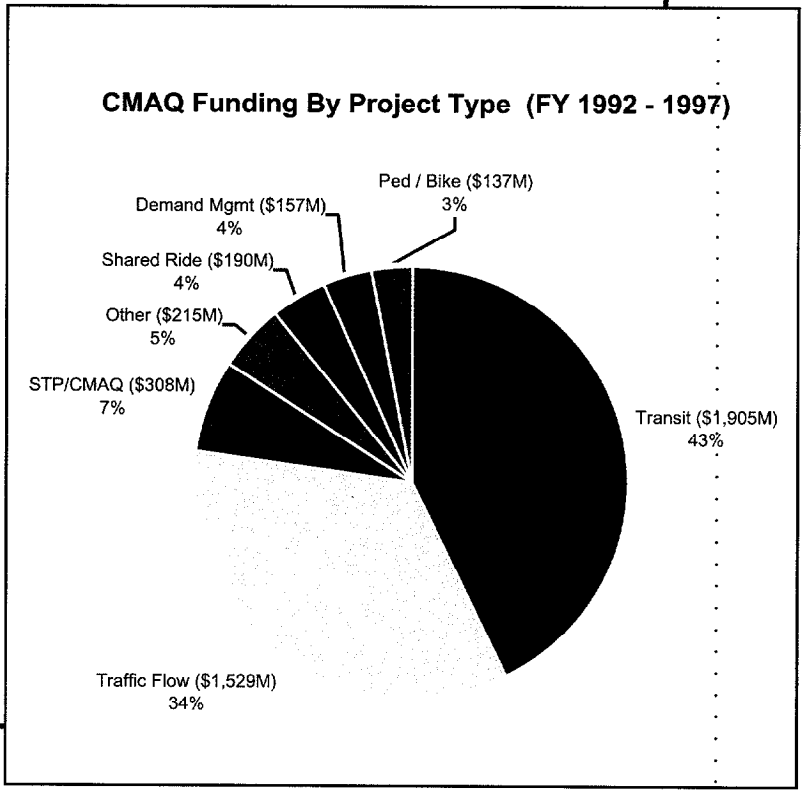
TEA-21 CMAQ Highlights at a Glance

The 1998-2003 CMAQ program under the Transportation Equity Act for the 21st Century (TEA-21) is a continuation of the innovative CMAQ program introduced under the ISTEA. The TEA-21 CMAQ program provides over $8.1 billion dollars in funds to State DOTs, MPOs, and transit agencies to invest in projects that reduce emissions from transportation-related sources. In TEA-21, the CMAQ program received approximately a 35 percent funding increase in basic authorization levels. Additional activities were made eligible for funding and the statutory formula for apportioning funds was redesigned to provide a more equitable distribution of funds.

CMAQ: The First Six Years

The first six years of the CMAQ Program resulted in $4.6 billion (of $5.5 billion available after set-asides) of funding for activities that assisted communities in reducing transportation related emissions, reducing congestion, and increasing public dialogue concerning pollution and transportation choices. The TEA-21 was designed to build and expand upon this success with the continued support of transportation partners and concerned citizens.

There are a variety of activities eligible for CMAQ funding (See FHWA Final Guidance for the CMAQ Improvement Program, published in the *Federal Register*, Volume 65, Number 36, Page 9040, February 23, 2000). According to the FHWA Annual Reports FY 1992-1997, during the first six years of the CMAQ Program, transit activities received the majority of the funding (43%), followed by traffic flow improvements, such as Intelligent Transportation Systems (34%), while the remaining activities such as pedestrian and bicycle, shared ride, and travel demand management, used the remaining funds.



The TEA-21 CMAQ program is similar to its ISTEA predecessor, but it features greater program flexibility and several new program options (see TEA-21 CMAQ Highlights).

TEA-21 CMAQ Highlights

- Federal allocation formulas were adjusted so that areas designated as submarginal and maintenance for ozone are now in the CMAQ apportionment formula, and there are new weighting factors for CO nonattainment areas.
- CMAQ funding eligibility was expanded to include PM-10 nonattainment and maintenance areas.
- Extreme low temperature cold start emissions control programs and magnetic levitation transportation technology deployment projects were made eligible for funds.
- States were given more flexibility to develop CMAQ activities with non-governmental entities in order to attract private investment under public/private partnerships.
- A portion of CMAQ funds may now be transferred to other programs such as Bridge, Maintenance, Surface Transportation Programs or National Highway System projects if the annual CMAQ appropriation exceeds $1.35 billion.
- States with minimum apportionment CMAQ funds have more flexibility regarding the use of their funds; they may use a portion of the funds for Surface Transportation Program purposes
- As with all Federal-aid programs, CMAQ authorized funds will be supplemented with "minimum guarantee" funds, assuring each State at least 90.5% of their trust fund revenues.

CMAQ Funding

During the initial 1992-1997 CMAQ Program period, a total of $6 billion was available for projects. Basic funding levels for the 1998-2003 TEA-21 program period were increased by 35 percent and are authorized at $8.1 billion. The basic amount of available funding is determined by a formula calculation based on population and EPA's severity classification for ozone and carbon monoxide air pollution (See Figure 7).

These basic authorizations will be augmented, perhaps significantly, from two sources. The first is through the TEA-21 provision that guarantees each State a minimum of 90.5 percent of the funds that are paid into the Highway Trust Fund (HTF). Part of the funds needed to raise a State's total Federal-aid apportionment to this level are added to the CMAQ basic authorization. For example, in 1999 these minimum guarantee funds added $235 million to the basic authorization. The second is through additions, part of which is added to the CMAQ program, which occur when the HTF revenues exceed projections. TEA-21 requires that authorization levels be realigned when this occurs. These funds under the Revenue Aligned Budget Authority are expected to increase CMAQ and other Federal-aid program funds substantially.

TEA-21 funds are apportioned to the State DOTs on an annual basis. Once the funds are apportioned to the State DOT, they are available for four years, and may be "obligated" or dedicated, to specific CMAQ projects.

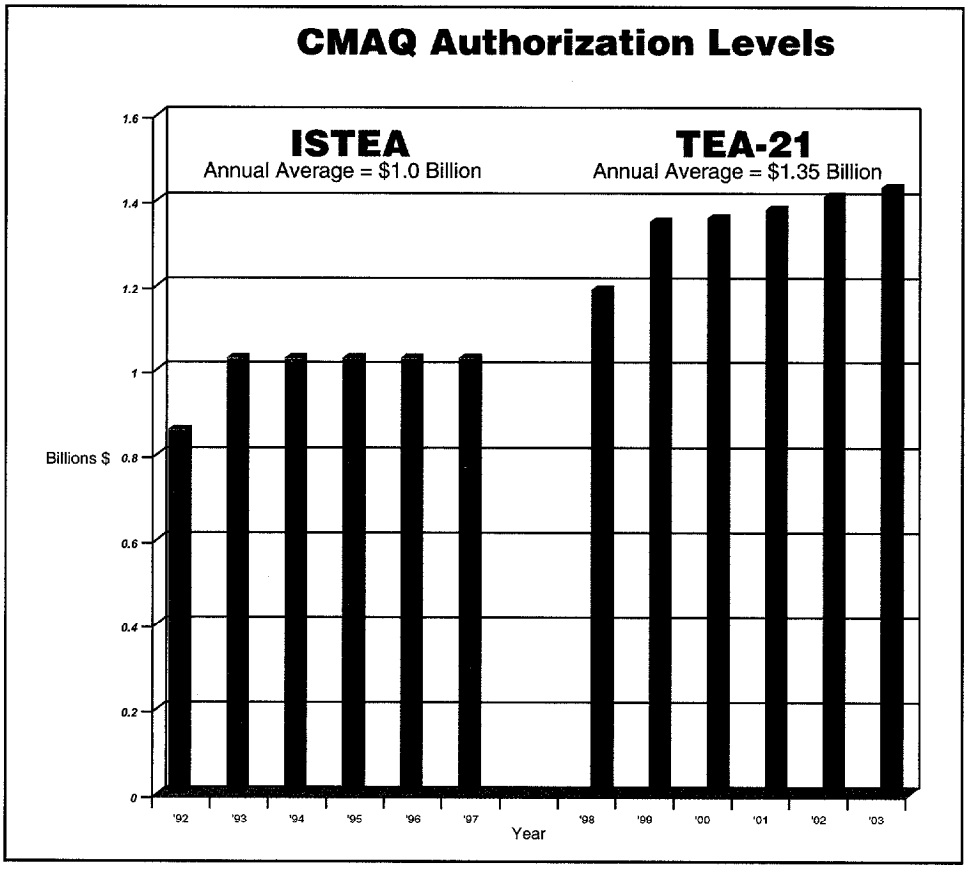


Figure 7 [7]

[7] Sources: Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Transportation Equity Act for the 21st Century (TEA-21) of 1998.

The obligation of funds assures the project sponsor that federal monies are available and will be provided for authorized projects. However, CMAQ funds are only released as reimbursement payments for completed work. Unused funds lapse at the end of the four year availability period, and are no longer available for use by the State.

CMAQ funds require a state or local match. The typical split between federal and project sponsor is 80 percent Federal, 20 percent State and/or local match.

It is important to develop and fund CMAQ projects that will assist an area in reducing transportation-related emissions. Some projects may be more effective and cost-effective than other projects.

Under certain circumstances a portion of a State's CMAQ funds may be transferred to other Federal-aid programs. This can only occur if the national CMAQ funding level for a given year is greater than $1.35 billion dollars. If this occurs, a State may transfer up to fifty percent of the surplus actual CMAQ apportionment funds to other Federal-aid projects in the transportation improvement program. However, the transferred funds must still be obligated in nonattainment and maintenance areas. The amount of transferable funds will vary from year-to-year and from State-to-State depending on overall authorization levels. The FHWA is responsible for calculating the amount and tracking the transfer of the eligible CMAQ funds.

Maximizing the Benefits of CMAQ Funding

It is important to develop and fund CMAQ projects that will assist an area in reducing transportation-related emissions. Some projects may be more effective and cost-effective than other projects. For some projects, project comparisons can be formulated by calculating an estimate for the amount of emission reductions per dollar spent. This cost-effectiveness analysis assists program managers with the evaluation of dissimilar CMAQ projects (for example, natural gas vehicles and refueling stations versus bike paths). Nevertheless, certain projects are more difficult to analyze. For example, in assessing the impacts of bicycle paths or a ride sharing program assumptions must be made about the number of automobile trips that will be reduced by people choosing these travel options.

Because CMAQ funds are limited compared to needs, planning officials should strive to maximize air quality benefits by allocating resources to the projects that are likely to achieve the greatest reduction in emissions. Consequently, projects that consistently reduce vehicle emissions for all trips may be more beneficial than projects which attempt to alter transportation demand for a particular trip, such as commuting which now constitutes only one-quarter of all trips. A thorough understanding of transportation demand, available resources and local traffic trends should indicate emission reduction strategies that are the most promising for a given geographical area.

The use of travel demand models may assist with the development of travel scenarios and model outputs can assist with estimating the corresponding emissions. Often, these models use many different inputs. FHWA can be contacted for a compilation of techniques that have been used to estimate emissions for a range of transportation projects. Research in this area continues to progress and tools to analyze the impacts of CMAQ funded projects are being continuously refined. While better modeling and improved analysis will almost certainly assist decisionmakers on which projects are estimated to yield better benefits, judgement and thoughtful consideration will also be necessary to select the best projects.

Eligibility

Because CMAQ funds are intended to improve air quality, funds must be spent in nonattainment or maintenance areas. A nonattainment area is an area formally designated (in the Code of Federal Regulations) by EPA as not meeting the NAAQS. A maintenance area is an area that was nonattainment but has subsequently attained the NAAQS and was officially redesignated to attainment by EPA.

The CMAQ program strives to reduce transportation-related emissions by providing State DOTs and local governments options to fund different emission reduction strategies. For example, the CMAQ Program enables communities to increase public awareness concerning the links between transportation choices and air pollutions; provide technological applications to improve transportation system efficiency; increase transit services; or implement "Ozone Action" programs. Many of these activities could be Transportation Control Measures (TCMs). Most of the eligible categories of CMAQ projects are TCM-type activities and include a wide variety of measures to decrease vehicle emissions, primarily by reducing the total amount of vehicle miles traveled (VMT) in an area. Certain projects are ineligible for CMAQ funds. Legislative prohibitions exclude vehicle retirement programs and highway capacity expansion projects. Policy considerations exclude highway maintenance and reconstruction projects because these activities preserve existing levels of service and are unlikely to contribute to further improvements in air quality.

Transit and Public Transportation Programs

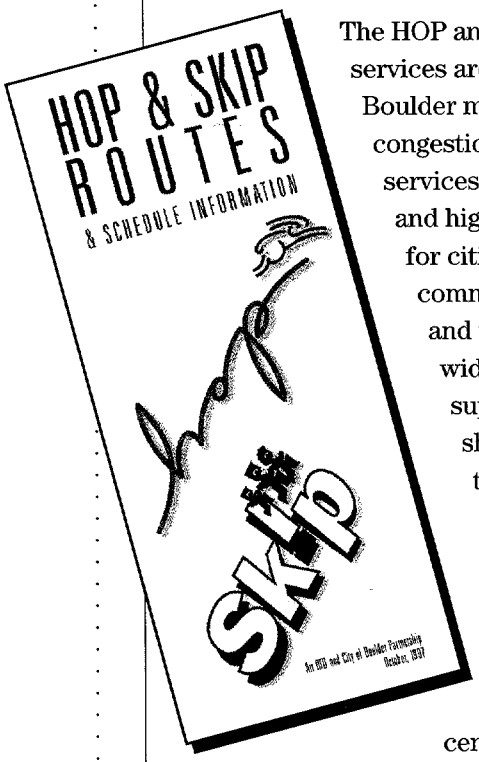
CMAQ funds may be used to support the use of public transportation. There are three broad categories of transit projects or programs that are eligible for funding: service or system expansion; provision of new transit service; and financial incentives to use existing transit services. Service expansion strives to attract new users, typically by providing new transit facilities or additional transit vehicles. Improving intermodal connections in the major urban areas has been a focus since ISTEA and these projects are generally eligible for CMAQ funding.

The start-up of new transit service (e.g., new express bus routes or new shuttle service linking major activity centers) is supported under the CMAQ program in an effort to tap new markets for transit. While CMAQ cannot be a permanent source of funding for transit service, the goal is to encourage experimentation to determine whether new types of services are viable.

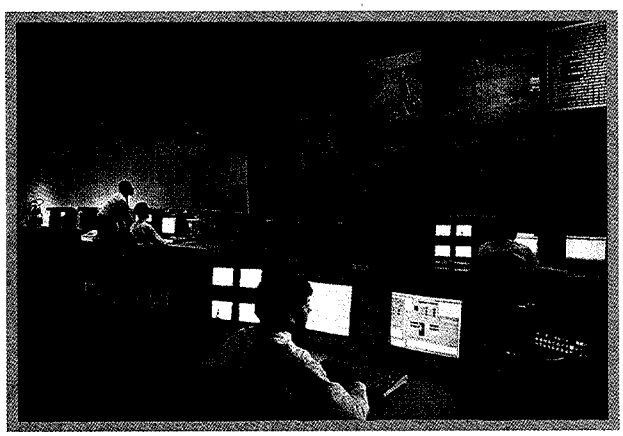
Financial incentive strategies attempt to encourage transit use, and include innovative fare policies as part of an overall effort to reduce exceedances of the air quality standards. Under specific conditions, CMAQ may be used to offset the cost of offering reduced or free transit fares. This can be done when the subsidized fare is an element of an overall, area wide strategy for reducing emissions during peak periods of ozone pollution.

Noteworthy transit success stories which were partially CMAQ-funded include the St. Louis Metrolink Program, an 18-mile light transit line that connects suburban communities with the city. Another innovative project was the Boulder, Colorado Hop and Skip Community Transit System. The program received the 1999 FHWA Environmental Excellence Award.

City of Boulder Special Transit Regional Transportation District[8]



The HOP and the SKIP transit services are helping the city of Boulder meet its clean air and congestion relief goals. The services provide easy access and high frequency service for citizens and commuters in Boulder, and they have received widespread community support. The HOP shuttle circulates through three main activity centers. The SKIP provides service that connects residents to employment centers and retail districts along the route. Each day, the HOP and SKIP provide service for close to 10,000 riders. Through partnerships, creative planning, and public involvement, the transit services demonstrate how citizens working with local government can set up a successful, cost-effective, and community-oriented transit system.



Traffic Flow Improvements

This strategy reduces emissions by promoting efficient traffic movement, thereby reducing unproductive travel delays and emissions resulting from engine idling. There are many ways to reduce and improve air quality by improving traffic flow. These include: traffic signal synchronization, channelization (to separate turning movements, for example), high occupancy vehicle lanes, and transportation management improvements. Of particular note are Intelligent Transportation Systems (ITS). The ITS efforts, using the very latest technologies, may be among the most innovative traffic flow improvement activities that are funded by CMAQ. In Fiscal Year (FY) 1997 the majority of CMAQ funds went to traffic flow improvements for the first time in program history, and much of this growth can be attributed to increased interest in ITS activities. FY 1996 and FY 1997 CMAQ funds were used for ITS projects that range from the ITS Early Deployment Plan in New York or the Traffic Operations Centers in New Jersey, Georgia and California to placing fiber optic cables in Texas and Kentucky's deployment of the Interstate Traffic Management Program.

Travel Demand Management Strategies

The demand for transportation can be moderated by adopting policy incentives that minimize the aggregate number of single occupancy vehicle trips and miles traveled. These strategies have grown substantially over the years and many metropolitan areas employ them to good advantage. Guaranteed Ride Home programs, employer outreach, public education, telecommuting, transportation management organizations, and other alternatives are also used to encourage trip reduction.

[8] Source: FHWA 1999 Environmental Excellence Awards

Ride Sharing Programs

Ride sharing programs are designed to increase vehicle occupancy in an attempt to reduce emissions. This can be achieved by minimizing the total number of vehicles on the road and these programs are most effective for commuting purposes. Ride sharing programs tend to be most effective when participants save time or money by ridesharing, for example when high occupancy vehicle lanes are available that reward those traveling with 2 persons or more in a vehicle through reduced travel times.

Pedestrian and Bicycle Programs

No mobile source emissions are produced by travelers using bicycles or walking, therefore, programs that promote these options are eligible for CMAQ funds. The substitution of bicycling and walking for relatively short trips is especially beneficial, because brief automobile trips result in disproportionately large emissions caused by cold engine starts and fuel evaporation after the conclusion of the trip.

Bicycle programs may include the creation of trails, storage facilities, and marketing efforts designed to support bicycles as a form of transportation. The bicycle, as a viable transportation mode, has spurred many communities to incorporate bicycling facilities into urban plans, stimulating the reduction of motor vehicle emissions in some areas.

One such example is the Long Beach Bikestation in California which provides a convenient transfer point for riders on the adjacent light rail line. In addition, the Bikestation includes mechanics on site and provides secure bike lockers and rental bicycles. The Long Beach Bikestation has become a community hub for bicycle advocacy, transit information and community events.

Education and Outreach

CMAQ funding may be used to increase public knowledge of transportation-related emissions and opportunities to reduce them through mitigation strategies and improved transportation choices.

Successful education and outreach projects have included metropolitan public awareness campaigns, such as "Ozone Action" day programs that inform citizens about the causes of rising ozone levels during the day. Other activities have included public-private projects. One project in Houston-Galveston, Texas, assessed public resistance to transit and led to the development of compelling marketing materials, reduced fares and the targeted promotion of transit services and resulted in a significant increase in transit ridership.

Inspection and Maintenance Programs

Poor engine maintenance and malfunctioning of pollution control equipment can significantly increase the amount of emissions released per vehicle. According to EPA analysis, only 10 percent of the vehicles on the road produce 50 percent of the pollution. Consequently, CMAQ funds may be used to introduce, conduct and provide start-up costs for automobile inspection and maintenance programs.

Extreme Cold Start Programs

Several physical factors impact engine performance and increase emissions. Cold temperatures, and cold engine starts increase emissions because specialized exhaust equipment, such as catalytic converters, take time to warm up to the optimum operating temperature. While an important phenomenon everywhere, it is particularly crucial in cold-weather climates. CMAQ funds may be directed towards the development and implementation of programs that are designed to reduce or mitigate excessive cold start emissions. It is estimated that for a five mile trip, the cold car generates about 30 percent more NOx and 60 percent more carbon monoxide than starting the car when it is warm.

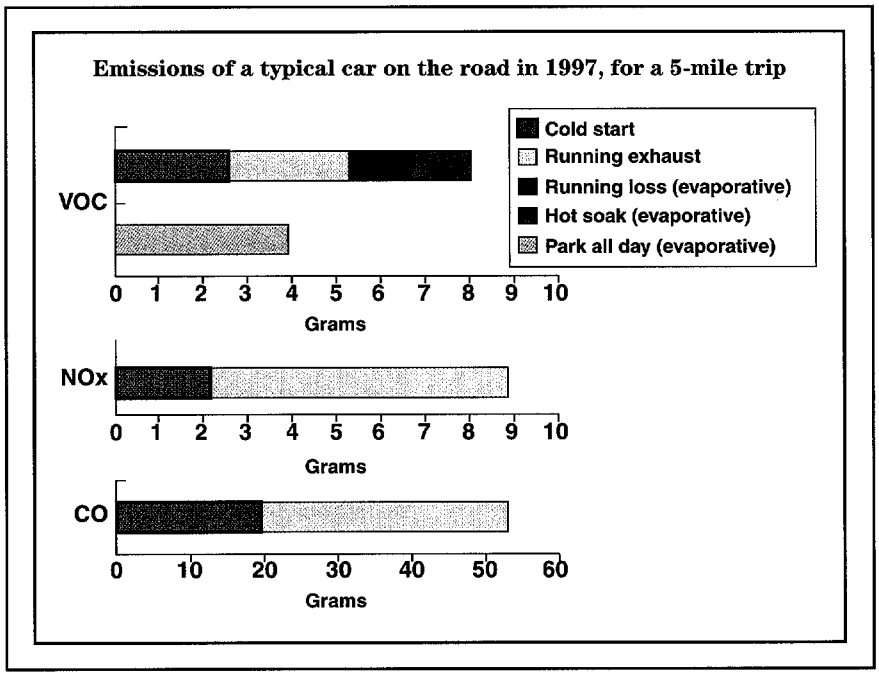
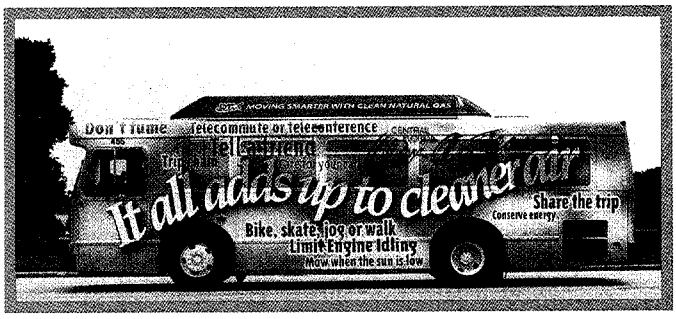


Figure 8[9]. Trip Emissions

Alternative "Clean" Fuels

Alternative or clean fuels are defined somewhat differently in the Clean Air Act and Energy Policy Act. But for CMAQ purposes an "alternative" fuel must reduce emissions to be eligible. These fuels can include natural gas, ethanol, methanol, electricity and liquefied propane gas. While a great many transit providers have used CMAQ funds for switching to alternative fuels, eligibility also extends to the purchase of vehicles and refueling equipment for other public agencies as well. And under TEA-21, eligibility can even extend to private companies (see Figure 8).



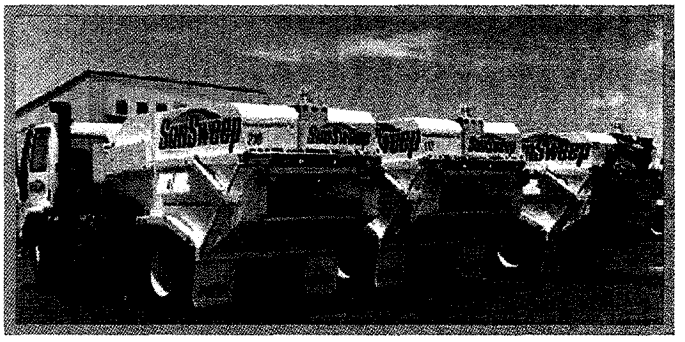
Public/Private Partnerships

Partnerships between public and private enterprises can leverage scarce funding resources by allowing private firms to own or operate a service developed with public funds. Often, public support is vital for projects that are not yet commercially viable because they lack markets sufficiently developed to stimulate private sector investment. TEA-21 eliminates some of the restrictions that previously limited private participation in emission reduction projects.

Some partnerships are ineligible for public funding because the private participation is mandated by law. CMAQ funds can not be used to help a private entity come into compliance with specific legal requirements, such as Clean Air Act or Energy Policy Act mandates. However, if the private entity clearly goes beyond the requirements, CMAQ funds may be used if the eligibility provisions are met. Furthermore, without public sponsorship or a contractual arrangement between a public agency and a private firm, CMAQ funds cannot be directed to the private sector.

[9] Source: FHWA, *Transportation Air Quality Selected Facts and Figures*, 1999, page 29

Public agencies interested in a partnership project need to consider several institutional and administrative issues. Federal regulations are



often a major challenge to people unfamiliar with the process. Local match provisions, reimbursement conditions, environmental clearances, and other requirements apply regardless of whether a project is implemented by a public or private entity. Public partners need to consider contract administration issues, including the length of a contract, and legal recourse in the event of contract performance deficiencies.

Private corporations interested in partnership arrangements need to be aware of program funding characteristics. Potential funding changes include annual appropriation levels or program cancellation. Private partnerships may need to produce satisfactory financial returns for shareholders, but these returns may be set by regulatory authorities in noncompetitive or monopoly market environments.

Experimental Pilot Projects

The CMAQ Program has proved overall to be a highly successful experiment in Federal transportation funding. However, there are many possible ways to use CMAQ funds in which Federal, State and local authorities may have little experience. Experimental pilot projects are innovative initiatives that are designed to provide a funding mechanism for well thought out strategies that extend beyond current experience and are not explicitly eligible under the law. Before and after evaluations are required to see if the experimental project has produced air quality benefits, and States may not use more than 25 percent of their annual CMAQ apportionment. Pilot projects are usually unique, with few precedents to guide the proposal and development process, but technical assistance is available from Federal agencies, including FHWA and FTA. Experimental pilots must meet all legal requirements – they must be reasonably classified as transportation projects; they must show potential to reduce emissions; and they cannot violate any legal restrictions.

Recipient Responsibilities

The project sponsor is usually responsible for assembling the proper documentation for CMAQ proposals. The requirements to apply for CMAQ funds vary by metropolitan area and State. Interested parties should contact their State DOT or MPO to find out the requirements for their nonattainment or maintenance area. Once the project is found eligible by FHWA or FTA, the recipient must follow through by supplying information necessary for the State DOT to adequately develop the required annual report. Every effort should be made by the project sponsors to quantify, or qualitatively assess, (if quantification is impossible), the proposal's benefits.

Reporting Requirements

The CMAQ Guidance requires State DOTs to provide FHWA with annual reports detailing their CMAQ projects. The report should list the CMAQ projects by category, and include information about emission reduction estimates and project costs. Generally, these reports are prepared on a Federal fiscal year basis.

CMAQ and Transportation Conformity

In order to fund the best projects, transportation and air quality planning must be fully integrated. Without a comprehensive picture of an urban, nonattainment area's transportation and air quality needs, including detailed understanding of the interrelationship between congestion, travel growth, and transportation-related emissions, it will be extremely difficult to maximize the effectiveness of an area's CMAQ funding. At the nexus of transportation and air quality planning is transportation conformity. And CMAQ funding has, in many instances, been critical to making a conformity determination and maintaining the flow of Federal transportation funds without disruption.

CMAQ funding has been crucial to avoiding costly disruptions in the Federal funding process.

Transportation planning in metropolitan communities strives to maximize mobility and accessibility while simultaneously minimizing air pollution. The MPOs are composed of representatives from regional transportation organizations and local governments. Planning activities are initiated by MPOs and in order to achieve transportation goals, follow a formal "continuing, comprehensive and cooperative" planning process. The process begins with public participation and input that reflects the values and priorities of the community.

Conformity is a requirement of the CAA which states that transportation plans, programs and projects must "conform" to a state's plans to attain the air quality standards. A demonstration of conformity is required to receive federal funds and approvals before advancing projects. If the demonstration cannot be made, only certain projects may proceed until it can be.

Conformity brings together transportation and air quality planning. The MPO creates a 20 year transportation plan and the Transportation Improvement Program (TIP) which is a prioritized list of transportation activities in the MPO area. For an MPO in a nonattainment (or maintenance) area, the predicted air emissions from the plan and TIP must not exceed an emissions limit established by the State air quality agency. These documents embody the MPO's vision for addressing the area's transportation needs in consultation with the State DOT. By contrast, each State air quality agency is responsible for developing a plan to achieve the national air quality standards. The State Implementation Plan, referred to as the SIP, describes emission reduction efforts to attain the NAAQS and is subject to EPA approval. Without adequate planning to address both the transportation needs and for attainment of the standards, the conformity process can become unbalanced, making the demonstration of conformity problematic.

The CMAQ program, which has sometimes been referred to as the funding arm of the Clean Air Act, has a direct and important relationship with conformity and air quality compliance. It can be an important funding strategy for implementing such measures as CAA-required inspection and maintenance programs or conversions to alternative fuels. One of its greatest benefits has been toward assisting the demonstration of conformity.

When preliminary analysis indicates that conformity cannot be established, it may mean that the MPO and the State DOT must change the timing or mix of transportation projects in the Plan/TIP, delaying or eliminating needed transportation improvements. An alternative to this is to identify emissions-reducing projects as offsets which may be funded under the CMAQ program. In this way, CMAQ funding has been crucial to avoiding costly disruptions in the Federal funding process.

CMAQ Program Assistance, Project Proposals and the Federal Aid Process

CMAQ funds are available to a wide range of government and non-profit organizations, as well as private entities contributing to public/private partnerships, but are controlled by the MPO and the State DOT. Often, these organizations plan or implement air quality programs and projects as well as provide CMAQ funding to others to implement projects.

All phases of project development are eligible for CMAQ funds. However, to keep your project eligible for reimbursement, each phase must be approved prior to spending money . . .

Organizations interested in obtaining CMAQ funding need to develop their ideas and prepare a project proposal using State DOT or MPO procedures. The project proposal must document how the project will provide emissions benefits before CMAQ eligibility is determined. Wherever possible, a quantitative emissions reduction estimate should be presented, although certain project categories, such as public education, marketing, or other outreach efforts are not easy to assess quantitatively. Instead, for these projects, a logical explanation of the emission reduction contribution and air quality benefit may be acceptable.

The process by which proposals for CMAQ funds are solicited is unique to each State and MPO. Therefore, project sponsors should pay careful attention to the submission guidelines and deadline schedules that are established in their State and/or MPO. The MPO is responsible for developing and prioritizing projects and works with the State DOT to set the CMAQ Program investment level. In some States, CMAQ funding is programmed and projects are selected every two years. Consequently, a missed deadline may create significant delays for a worthwhile CMAQ proposal.

As stated above, all projects which are to receive federal funding or approval must come from the latest conforming plan and TIP. All CMAQ projects must come from the fiscally constrained plan and TIP in order to be authorized. Authorization is the final approval that is given by FHWA or FTA. If you have a CMAQ project you would like to have funded, it must first be placed on the plan and TIP by the MPO. This process varies among MPOs and it is recommended you contact your MPO with your suggestions for CMAQ projects.

Project Development and Environmental Clearance

All federally funded projects have several stages, all of which require time, effort and coordination. The simplicity or difficulty of your project will dictate the amount of time and effort it requires. Projects funded with CMAQ must comply with laws created to protect the human and natural environment.

There are a number of major milestones that are generally required for Federal-aid projects, including those under CMAQ. The agencies approving the project have certain responsibilities, as do the project sponsors. Once the project has received an eligibility determination from the FHWA or FTA, the project sponsor will be responsible for the planning, public involvement, environmental documentation, permits and approvals, design and development of plans, creation of right-of-way plans and acquisition of property, submission of procurement, bid and construction paperwork, selecting contractors and submission of materials for invoicing and annual reporting requirements. The Federal and State agencies provide environmental, right-of-way and utility clearances, and authorization (See Figure 9).

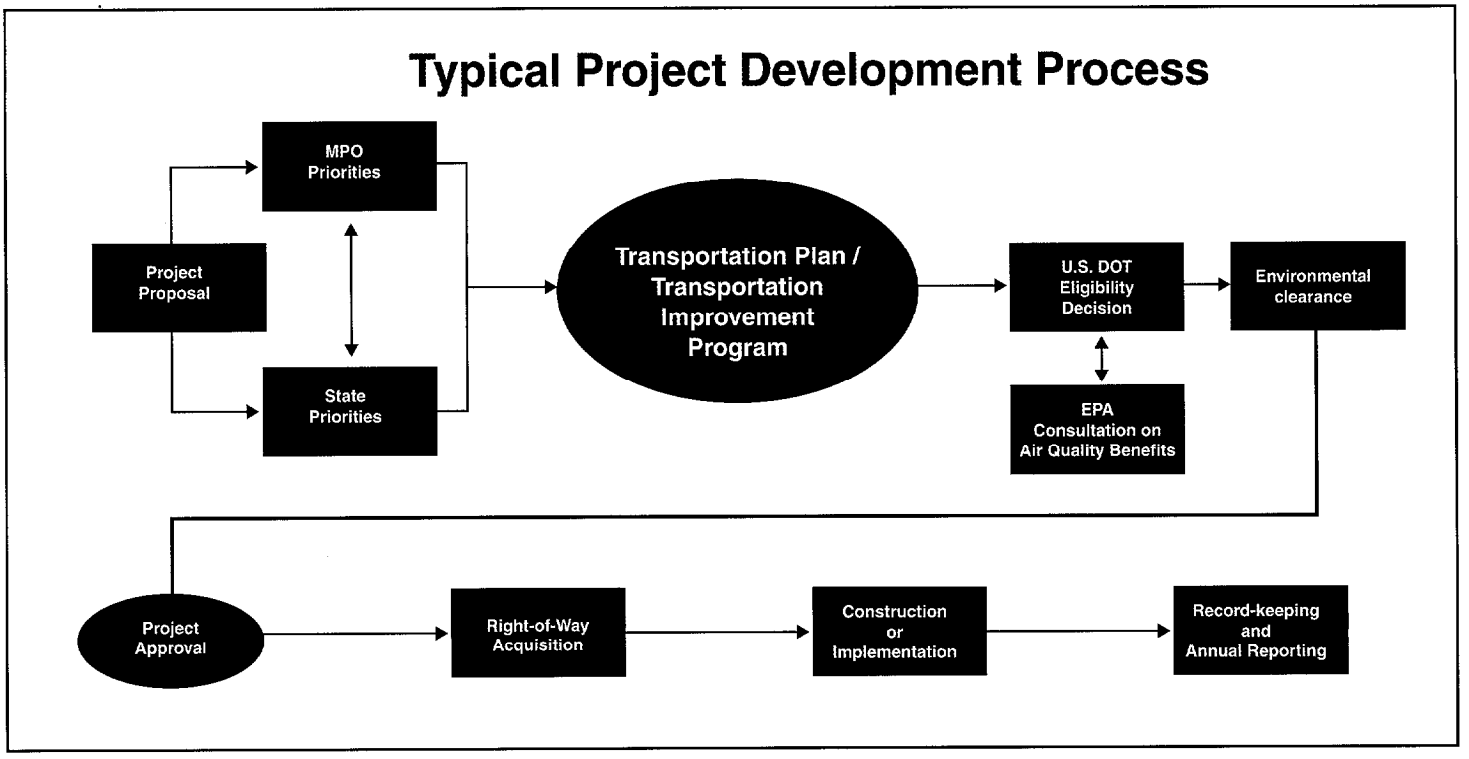


Figure 9[10]

[10] Source: FHWA

Environmental clearance covers a range of activities that may be required to meet federal and state environmental laws. This includes the National Environmental Policy Act (NEPA), the National Historic Preservation Act (Section 106), the Uniform Relocation Act, and other relevant laws. The environmental documentation process is designed to help project sponsors and federal agencies make decisions. Compliance with NEPA is required for Federal-aid projects and can range from a simple determination of no significant impacts to a fully executed Environmental Impact Statement. Your CMAQ project will need final NEPA approval from FHWA or FTA prior to further funding. Some MPOs require NEPA to be complete prior to placing the construction phase of a project on the TIP. In order to complete the environmental clearance process you may be required to hold one or more public meetings.

If you have any right-of-way to purchase, there are established laws that must be followed prior to starting the transaction and must be completed to approve your document and fund your project.

All phases of project development are eligible for CMAQ funds. However, to keep your project eligible for reimbursement each phase must be approved prior to spending money, purchasing right-of-way or signing contracts.

Many CMAQ-eligible projects do not require all steps in the above process to be followed. In other words, certain projects can benefit from a greatly streamlined project development process (e.g., ride-sharing programs, vanpool programs, public education programs, etc.). The best course of action is to work closely with your MPO and/or State DOT to determine how best to ensure that all required legal and environmental requirements are addressed.

The CMAQ program can aid communities in improving the quality of the natural environment by reducing highway-related pollution.

Looking to the Future

Highways and transportation facilities have significant effects on the natural environment and on the quality of life in communities. Through Federal-aid programs such as CMAQ, we work with our partners to ensure that highway and transit facilities enhance the natural environment.

The CMAQ program can aid communities in improving the quality of the natural environment by reducing transportation-related pollution. The FHWA and FTA partner with States and MPOs to strengthen the links between transportation investments and communities by supporting and promoting increased transportation options and programs and projects to reduce environmental impacts.

The country's transportation system faces many special challenges. Lane mileage has increased slowly, while highway travel has increased rapidly. Increased congestion is a result of this disparity. The implementation of an integrated ITS infrastructure system with CMAQ funds is just one of the underlying strategies and initiatives associated with achieving the strategic objective of reduced congestion by improving the operations and efficiency of our surface transportation system.

Other challenges include the growth in the demand for travel, which serves to partially counteract the emissions benefits of cleaner cars and cleaner fuels. In addition, as the new NAAQS for ozone and fine particulate matter begin to phase in, States will face new challenges in meeting the air quality targets. In nonattainment and maintenance areas, the impending impacts of potentially stricter NAAQS are expected to increase the challenge of meeting the transportation conformity requirements. FHWA and FTA aim to reduce mobile source emissions by encouraging the use of less polluting transportation options and supporting the deployment of fuel- and emission-efficient vehicles. Many of these activities are eligible for CMAQ funds.

While the FHWA and FTA are proud of the contribution the CMAQ Program has made to reductions in mobile source emissions and congestion, the CMAQ Program's emissions impacts must be recognized as one relatively small part of the solution to a large and complex problem.

Over the first 9 years CMAQ has opened up the project selection process, helped reduce mobile source emissions and helped slow the rate of growth of congestion in some of the nation's largest cities. The goals of improved mobility and environmental protection are a delicate balancing act repeated throughout the country every day. Given the ever changing demands on the funding program, air quality standards and the transportation system, CMAQ will continue to provide improved funding opportunities to meet these challenges.

Given the ever **changing** demands on the **funding** program, **air quality** standards and the **transportation** system, **CMAQ** will continue to provide **improved** funding **opportunities** to meet these **challenges.**

Appendix I

Air Emissions Glossary

Carbon Monoxide (CO)

Carbon monoxide is a colorless, odorless gas produced whenever incomplete fuel combustion occurs. In the United States, more than two-thirds of the carbon monoxide emissions come from transportation sources. In urban areas, motor vehicle contributions to carbon monoxide pollution can exceed ninety percent.

When inhaled, the gas forms carboxyhemoglobin, a compound that disrupts normal respiration by inhibiting the transfer of oxygen to specialized blood cells that transport the oxygen throughout the body. Symptoms from exposure include impairments in visual perception, manual dexterity, learning functions and the ability to perform complex tasks. Sensitive individuals, such as infants, the elderly or respiratory patients may be highly susceptible to acute symptoms of carbon monoxide poisoning.

Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter consists of airborne solid particles and liquid droplets. These particles are classified as "coarse" if they are smaller than 10 microns, or "fine" if they are smaller than 2.5 microns. Coarse airborne particles are produced during grinding operations, or from the physical disturbance of dust by natural air turbulence processes, such as wind. Fine particles can be a by product of fossil fuel combustion, such as diesel and bus engines.

Fine particles can easily reach remote lung areas, and their presence in the lungs is linked to serious respiratory ailments such as asthma, chronic bronchitis and aggravated coughing. Exposure to these particles may aggravate other medical conditions such as heart disease and emphysema and may cause premature death. In the environment, particulate matter contributes to diminished visibility and particle deposition (soiling).

Ozone (O_3)

Ozone is a chemically unstable molecule composed of three oxygen atoms. Ground level ozone is formed by sunlight and heat acting upon fuel combustion by products such as nitrogen oxides and hydrocarbons. Ozone occurs naturally in the upper atmosphere and shields the Earth from ultraviolet radiation. However, at ground level, ozone is a severe irritant and the primary component of "smog". In urban areas, at least half of the ozone producing components come from transportation sources such as automobiles. Because ozone formation is directly related to atmospheric temperatures, problematic ozone levels occur most frequently on hot summer afternoons.

Ozone exposure is linked to respiratory illnesses such as asthma and lung inflammation. Extended ozone exposure can exacerbate existing respiratory ailments such as chronic bronchitis and emphysema. Ozone pollution can severely damage vegetation including agricultural crops and forest habitats.

Carbon Dioxide (CO_2)

Carbon dioxide is the by product of complete fuel combustion. Although it does not impair human health, the accumulation of carbon dioxide in the atmosphere is believed to contribute to global climate changes by trapping the earth's heat.

Nitrogen Oxides (NO_x)

Nitrogen oxides form when nitrogen and oxygen atoms chemically react inside the high pressure and temperature conditions in an engine. Nitrogen oxides are precursors for ozone, and in the environment, they contribute to the formation of acidic rain.

Hydrocarbons (HC) or Volatile Organic Compounds (VOC)

Hydrocarbon emissions are a product of partial fuel combustion, fuel evaporation and refueling losses caused by spillage and vapor leakage. Hydrocarbons react with nitrogen oxides and sunlight to form ozone. Some hydrocarbons are toxic and may be carcinogenic.

Appendix II

State Transportation Contacts

STATES LISTED ALPHABETICALLY

Alabama Department of Transportation
1409 Coliseum Blvd.
Montgomery, AL 36130
(334) 242-6311
(334) 262-8041 Fax
web site: http://www.dot.state.al.us

Alaska Department of Transportation & Public Facilities
3132 Channel Drive
Juneau, AK 99801-7898
(907) 465-3900
(907) 586-8365 Fax
web site: http://www.dot.state.ak.us

Arizona Department of Transportation
206 S. 17th Avenue
Phoenix, AZ 85007
(602) 255-7226
(602) 255-6941 Fax
web site: http://www.dot.state.az.us

Arkansas Department of Transportation
P.O. Box 2261, Little Rock, AR 72203
10324 Interstate 30, Little Rock, AR 72209
(501) 569-2211
(501) 569-2400 Fax
web site: http://www.ahtd.state.ar.us

California Department of Transportation
1120 N Street
P. O. Box 942673
Sacramento, CA 94273-0001
(916) 654-5267
(916) 654-6608 Fax
web site: http://www.dot.ca.gov

Colorado Department of Transportation
4201 E. Arkansas Ave.
Denver, CO 80222
(303) 757-9201
(303) 757-9656 Fax
web site: http://www.dot.state.co.us

Connecticut Department of Transportation
P. O. Box 317546 / 2800 Berlin Turnpike
Newington, CT 06131-7546
(217) 782-5597
(217) 782-6828 Fax
web site: http://dot.state.il.us
(860) 594-3000
(860) 594-3008 Fax
web site: http://www.state.ct.us/dot/

Delaware Department of Transportation
Highway Administration Center
P. O. Box 778 Bay Road, Route 113
Dover, DE 19903 Dover, DE 19903
(302) 760-2303
(302) 739-5736 Fax
web site: http://www.state.de.us/deldot/index.html

District of Columbia Department of Public Works
Reeves Center
2000 14th Street, N.W., 6th Floor
Washington, DC 20009
(202) 939-8000
(202) 939-8191 Fax

Florida Department of Transportation
605 Suwannee Street
Tallahassee, FL 32399-0450
(850) 414-5205
(850) 488-5526 Fax
web site: http://www.dot.state.fl.us

Georgia Department of Transportation
2 Capitol Square
Atlanta GA 30334
(404) 656-5206
(404) 656-3507 Fax
web site: http://www.dot.state.ga.us

Hawaii Department of Transportation
869 Punchbowl Street
Honolulu, HI 96813-5097
(808) 587-2150
(808) 587-2167 Fax
web site: http://hinc.hinc.hawaii.gov/hinc/dot/dot.html

Idaho Transportation Department
3311 W. State Street
P. O. Box 7129
Boise, Id 83707
(208) 334-8807
(208) 334-3858 Fax
web site: http://www.state.id.us/itd

Illinois Department of Transportation
2300 S. Dirksen Parkway
Springfield IL 62764

Indiana Department of Transportation
Indiana Government Center North
100 N. Senate Avenue
Indianapolis IN 46204-2249
(317) 232-5526
(317) 232-0238 Fax
web site: http://www.ai.org/dot/

Iowa Department of Transportation
800 Lincoln Way
Ames, IA 50010
(515) 239-1111
(515) 239-1639 Fax
web site: www.state.ia.us/government/dot

Kansas Department of Transportation
Docking State Office
915 Harrison
Topeka KS 66612
(785) 296-3461
(785) 296-1095 Fax
web site: www.dot.state.ks.us

Kentucky Transportation Cabinet
State Office Building
High & Clinton Streets
Frankfort KY 40622
(502) 564-4890
(502) 379-1851 Fax
web site: http://www.kytc.state.ky.us/

Louisiana Department of Transportation and Development
P. O. Box 94245 1201 Capitol Access Rd.
Baton Rouge, LA 70804-9245 / Baton Rouge, LA 70804
(504) 379-1200
(504) 379-1851 Fax
web site: http://www.dotd.state.la.us/

Maine Department of Transportation
State House Station 16
Augusta ME 04333-0016
(207) 287-2551
(207) 287-2896 Fax
web site: http://www.state.me.us/mdot

Maryland Department of Transportation
P. O. Box 8755
10 Elm Road
BWI Airport MD 21240-0755
(410) 865-1000
(410) 865-1334 Fax
web site: http://www.mdot.state.md.us/

Massachusetts Highway Department
10 Park Plaza
Boston MA 02116-3973
(617) 973-7868
(617) 973-8040 Fax
web site: http://www.magnet.state.ma.us/mhd/home.htm

Massachusetts Executive Office of Transportation and Construction
10 Park Plaza, Suite 3510
Boston, MA 02116-3969
(617) 973-7000
(617) 523-6454 Fax

Michigan Department of Transportation
State Transportation Building
425 West Ottawa
P. O. Box 30050
Lansing, MI 48913
(517) 373-2114
(517) 373-0167 Fax
web site: http://www.mdot.state.mi.us

Minnesota Department of Transportation
395 John Ireland Boulevard
Room 411, Transportation Building
St. Paul MN 55155
(651) 297-2930
(651) 296-3587 Fax
web site: http://www.dot.state.mn.us/

Mississippi Department of Transportation
Woolfolk State Office Building 401 North West Street
P. O. Box 1850 10th Floor
Jackson MS 39215-1850 Jackson MS 39205
(601) 359-7001
(601) 359-7050 Fax

Missouri Department of Transportation
Highway and Transportation Building
P. O. Box 270
Corner, Capitol & Jefferson
Jefferson City MO 65102
(573) 751-4622
(573) 526-5419 Fax
web site: http://www.modot.state.mo.us

Montana Department of Transportation
2701 Prospect Avenue
Helena MT 59620
(406) 444-6201
(406) 444-7643 Fax
web site: http://www.mdt.mt.gov

Nebraska Department of Roads
1500 Nebraska Highway 2
P. O. Box 94759
Lincoln NE 65809-4759
(402) 479-4615
(402) 479-4325 Fax
web site: http://www.dor.state.ne.us

Nevada Department of Transportation
1263 S. Stewart Street
Carson City NV 89712
(702) 888-7440
(702) 888-7201 Fax
web site: http://www.nevadadot.com/

New Hampshire Department of Transportation
John O. Morton Bldg.
Hazen Drive
P. O. Box 483
Concord NH 03301-0483
(603) 271-3734
(603) 271-3914 Fax

New Jersey Department of Transportation
1035 Parkway Avenue, CN-600
Trenton NJ 08625
(609) 530-3535
(609) 530-3894 Fax
web site: http://www.state.nj.us/transportation

New Mexico State Highway and
Transportation Department
State Highway Department Building
1120 Cerrilos Road, P.O. Box 1149
Santa Fe, NM 87504
(505) 827-5110
(505) 827-5469 Fax
web site: http://www.nmshtd.state.nm.us

New York Department of Transportation
Building 5, State Office Campus
Albany, NY 12232
(518) 457-4422
(518) 457-4190 Fax
web site: http://www.dot.state.ny.us

North Carolina Department of Transportation
P. O. Box 25201
1. S. Wilmington Street
Raleigh NC 27611
(919) 733-2520
(919) 733-9150 Fax
web site: http://www.dot.state.nc.us/DOT

North Dakota Department of Transportation
608 E. Boulevard Avenue
Bismarck ND 58505-0700
(701) 328-2581
(701) 328-1420 Fax
web site: http://www.state.nd.us/dot

Ohio Department of Transportation
1980 West Broad Street
Columbus, OH 43223
(614) 466 2335
(614) 466-0587 Fax
web site: www.dot.state.oh.us

Oklahoma Department of Transportation
200 N.E. 21st Street
Oklahoma City OK 73105
(405) 521-2631
(405) 521-2093 Fax
web site: http://www.okladot.state.ok.us/

Oregon Department of Transportation
355 Capitol Street, N.E.
Salem OR 97310
(503) 986-3200
(503) 986-3446 Fax
web site: http://www.odot.state.or.us/

Pennsylvania Department of Transportation
Forum Place
555 Walnut Street
Harrisburg, PA 17101-1900
(717) 787-5574
(717) 787-5491 Fax
web site: http://www.ppt.psu.edu/

Puerto Rico Department of Transportation
and Public Works
Office of the Secretary
P. O. Box 42007
San Juan PR 00940-2007
(787) 725-7112
(787) 728-8963 Fax
web site: http://www.dtop.gov.pr

Rhode Island Department of Transportation
2 Capitol Hill
State Office Building
Providence RI 02903
(401) 222-2481
(401) 222-6038 Fax
web site: http://www.state.ri.us

South Carolina Department of Transportation
Silas N. Pearman Building
955 Park Street
P. O. Box 191
Columbia SC 29202
(803) 737-1300
(803) 737-2038 Fax
web site: http://www.dot.state.sc.us

South Dakota Department of Transportation
700 East Broadway Avenue
Pierre SD 57501-2586
(605) 773-3265
(605) 773-3921 Fax
web site: www.state.sd.us/state/executive/dot

Tennessee Department of Transportation
700 James K. Polk Building
Fifth and Deaderick
Nashville TN 37243-0349
(615) 741-2848
(615) 741-2508 Fax
web site:www.state.tn.us/transport

Texas Department of Transportation
Dewitt C. Greer Highway Building
125 E. 11th Street
Austin TX 78701-2483
(512) 305-9501
(512) 463-0283 Fax
web site: www.dot.state.tx.us

Utah Department of Transportation
UDOT/DPS Complex
4501 S. 2700 West
Salt Lake City UT 84119
(801) 965-4113
(801) 965-4338 Fax
web site: http://www.sr.ex.state.ut.us

Vermont Agency of Transportation
State Administration Building
133 State Street
Montpelier VT 05633
(802) 828-2657
(802) 828-3522
web site: http://www.aot.state.vt.us

Virginia Department of Transportation
1401 E. Broad Street, Room 414
Richmond VA 23219
(804) 786-6675
(804) 786-6683 Fax
web site: http://www.vdot.state.va.us/

Washington Department of Transportation
Room 3D25 Transportation Building
Jefferson Street at Maple Park
Mail Stop: KF-01
Olympia WA 98504
(360) 705-7054
(360) 705-6800 Fax
web site: http://www.wsdot.wa.gov

West Virginia Department of Transportation
1900 Kanawha Boulevard, E.
Charleston, WV 25305-0440
(304) 558-0444
(304) 558-4076 Fax
web site: http://www.state.wv.us/wvdot/wvtrans.htm

Wisconsin Department of Transportation
4802 Sheboygan Avenue
P. O. Box 7910
Madison WI 53707-7910
(608) 266-1114
(608) 266-9912 Fax
web site: http://www.dot.state.wi.us

Wyoming Department of Transportation
5300 Bishop Boulevard
P. O. Box 1708
Cheyenne WY 82003-1708
(307) 777-4484
(307) 777-4163 Fax
web site: http://www.wydotweb.state.wy.us

Appendix III

Metropolitan Planning Organization

For the Metropolitan Planning Organization in your area, consult the National Association of Regional Council's website at www.narc.org/ampo/mposnet.html

Appendix IV

Other Air Quality Resources

Other Air Quality Resources: United States Department of Transportation Contacts

Federal Highway Administration (FHWA)
FHWA
Office of Natural Environment
400 7th Street, SW, Room 3240
Washington, D.C. 20590
(202) 366-6724
http://www.fhwa.dot.gov/environment/cmaq.htm

Federal Transit Administration (FTA)
Office of Planning
400 7th Street, SW, Room 9413
Washington, D.C. 20590
(202) 366-4033
http://www.fta.dot.gov

Environment Protection Agency (EPA)
USEPA
Office of Transportation and Air Quality
2000 Traverwood Drive
Ann Arbor, MI 48105
http://www.epa.gov/otaq/transp.htm

the congestion mitigation and air quality improvement program

Publication No. FHWA-EP-00-020
HEPN-11-00(20M)E

Analysis Brief

FEDERAL MOTOR CARRIER SAFETY ADMINISTRATION

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Motor Carrier Drug and Alcohol Violations: Comparison of Compliance Review Data from SafeStat Selected Carriers and a Random Sample of Carriers

The goal of the Federal Motor Carrier Safety Administration (FMCSA) is to reduce the number and severity of large truck-involved crashes through more commercial motor vehicle and operator inspections and compliance reviews, stronger enforcement measures against violators, expedited completion of rulemaking proceedings, scientifically sound research, and effective commercial driver's license testing, record-keeping, and sanctions.

The Office of Data Analysis and Information Systems develops and maintains systems for collecting and analyzing motor carrier data, and disseminates information on the motor carrier industry.

This Analysis Brief has been produced by the Analysis Division within the FMCSA's Office of Data Analysis and Information Systems. The Division analyzes motor carrier data pertaining to crashes, inspections, compliance reviews, and drug and alcohol testing; and supports research on the effectiveness of FMCSA inspections and compliance review programs.

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Introduction

As of January 1, 1996, all domestic motor carriers with active commercial driver's license (CDL) operators must have a controlled substance and alcohol testing program. Foreign-based carriers with operations in the United States are also required to have similar programs (see Part 382.115 of the Federal Motor Carrier Safety Regulations [FMCSRs]). Noncompliance with specific requirements of Part 382 of the FMCSRs (Controlled Substances and Alcohol Use Testing) may affect a carrier's compliance review (CR) safety rating.

There has been interest, both within and outside the Federal Motor Carrier Safety Administration (FMCSA, formerly the Office of Motor Carriers of the Federal Highway Administration), in the extent to which motor carriers are in compliance with Part 382, as well as the extent to which the agency's CR selection software, known as SafeStat (Safety Status), captures noncompliant carriers. To address this issue, a random sample of motor carriers was selected in 1997 for special "drug and alcohol" compliance reviews (focusing solely on compliance with Part 382). These reviews were conducted during the latter half of 1997 and in 1998. The results from this random sample were then compared to data collected from motor carriers recently targeted for review by SafeStat. The methodology and results of this analysis are presented below.

Methodology

Eight hundred motor carriers were randomly selected from FMCSA's Motor Carrier Management Information System (MCMIS) Census File for "drug and alcohol" reviews by means of a stratified random sample. With this approach, carriers in the MCMIS sampling frame were first grouped into size classes, based on their total CDL driver count. A systematic sample of carriers (selecting every *kth* unit) was then selected in each size class stratum. The size-class definitions, as well as the number of motor carriers selected and reviewed in each size class, are given in **Table 1**. The size class labeled "Unknown No. CDL Drivers" represents carriers whose total CDL driver count was equal to zero in the MCMIS Census File—indicating that the total is either zero or unknown. If it was later determined that such a carrier had no CDL drivers, the review was not conducted since Part 382 would not apply.

The discrepancy shown in the table between the number of carriers selected into the sample in each stratum and the number of selected carriers actually reviewed resulted from several factors. First, a selected carrier may have had a recent review, making it inappropriate to conduct another one during this time period. Second, in

Table 1.
Number of Carriers Selected into CR Random Sample By Size-Class Stratum

Size Class of CDL Drivers	Number in Population	Number Selected	Number of Selected Receiving CR
Unknown	290,406	310	81
1–19	78,798	210	86
20–49	4,165	70	46
50–99	1,496	70	45
100–999	1,399	70	45
1000+	102	70	42
Total	376,366	800	345

Table 2.
Percentage of Carriers in Random Sample in Noncompliance with Part 382 by Size Class and Violation Type

Size Class of CDL Drivers (from MCMIS)	At Least One Acute Violation	At Least One Critical Violation	No Program in Place	At Least One Violation
Unknown	48%	16%	35%	62%
1–19	40%	10%	24%	45%
20–49	9%	33%	2%	39%
50–99	4%	18%	0%	18%
100–999	9%	13%	2%	16%
1000+	5%	17%	0%	19%

the case of carriers in the "Unknown" size class, a selected carrier may have been found to have no CDL drivers, making it exempt from Part 382. Finally, the total number of carriers actually reviewed depended on the resources available in each FMCSA Service Center for conducting such reviews.

Data on motor carrier compliance with Part 382 from the 345 carriers in the random sample were compared with similar data collected from motor carriers selected for compliance reviews by SafeStat. For the SafeStat comparison group, only carriers reviewed in 1998 and having known CDL counts in MCMIS were considered. (Had the carriers with "Unknown" CDL counts been included in this group, it would have been impossible to distinguish between those carriers with no Part 382 violations because they have no CDL drivers, and those carriers with no Part 382 violations because they are in full compliance, since CDL driver counts are not currently a data element in MCMIS's compliance review data base; for the random sample, such carriers did not have to be excluded since reviews were performed only when carriers had CDL drivers.)

Findings

The percentage of carriers reviewed in the random sample with at least one acute violation, at least one critical violation, and any violation of Part 382 is given below in Table 2, broken down by carrier size. The table indicates that those carriers whose CDL driver information was missing in MCMIS (size class unknown) had the highest rates of noncompliance with Part 382 (62 percent), followed by the "1–19 CDL Driver" size class (45 percent). Based on the information presented in the table, these high violation rates may stem from the fact that many of these carriers do not have testing programs in place. Not having a testing program in place is an acute violation of Part 382, and may also explain why a large percentage of the carriers in these two class sizes have at least one acute violation (48 percent and 40 percent respectively).

The percentages given in **Table 2** for each size-class stratum can be used to produce population estimates for the percentage of carriers in the industry, as a whole, that are in noncompliance with Part 382. Population estimates for the four violation categories shown in the table were generated using the standard statistical formula for estimating a population percentage **P** from a stratified random sample:

(1) $$P = (1/N) * \Sigma N_h * p_h,$$

where p_h is the estimate of the percentage of carriers in stratum **h** having the characteristic in question, N_h is the total number of carriers in stratum **h**, **N** is the total number of carriers in the population, and the summation is across all strata. Formula #1 represents a weighted average of the size-class percentage estimates, where each size-class estimate is weighted according to its population size (see **Table 1**).

The statistical precision of **P** is measured by its variance, **V**:

(2) $$V = [1/N^2] * \Sigma N_h^2 * (N_h - n_h) * \{p_h * (1 - p_h) / n_h\} / (N_h - 1),$$

where n_h is the number of units sampled in stratum **h**. Based on the variance, **V**, a 95 percent confidence interval can be developed for each population estimate. Based on statistical theory, one would

expect the population estimate to fall within the confidence interval 95 percent of the time, if the survey were to be replicated multiple times.

Population estimates and their associated confidence intervals are presented below in **Table 3** for the four violation categories.

Table 3.
Population Estimates of the Percentage of Carriers in Noncompliance with Part 382, by Type of Violation, Based on the Random Sample

At Least One Acute Violation	At Least One Critical Violation	No Program in Place	At Least One Violation
46% ± 9%	15% ± 6%	32% ± 8%	58% ± 8%

Because the motor carriers in the "unknown CDL" size class constitute such a large fraction of the total motor carrier population (77 percent), it is not surprising that the estimates given above are primarily driven by the data collected from this size class (this can be seen directly by comparing **Table 3** with the results obtained for the "unknown CDL" size class in **Table 2**).

Table 4.
Population Estimates of the Percentage of Carriers in Noncompliance with Part 382, for Carriers with Known CDL Counts in MCMIS, by Type of Violation, Based on Random Sample

At Least One Acute Violation	At Least One Critical Violation	No Program in Place	At Least One Violation
37% ± 9%	12% ± 6%	23% ± 8%	44% ± 10%

If the "Unknown Number of CDL Drivers" size-class stratum is excluded from the analysis, similar noncompliance rates can be made for the segment of the motor carrier population whose CDL driver information is known in MCMIS. This information is given in **Table 4**. In this case, the estimates are primarily driven by the data collected from the "1 to 19" size class, which constitutes 92 percent of this subpopulation. Limiting the scope of the estimates to this subpopulation allows for a direct comparison between the overall random sample estimates and the overall estimates from the SafeStat comparison group.

SafeStat Comparison Group

The percentage of motor carriers from the SafeStat comparison group in noncompliance with Part 382 is given in **Table 5**.

Comparing **Table 5** with **Table 2**, one notes that the random sample found a slightly higher percentage of noncompliant carriers in the smaller size classes, whereas the SafeStat comparison group has a considerably higher percentage of such carriers in the larger size classes. The largest discrepancy occurs in the "1–19" size class, where the random sample found considerably more carriers with no drug testing program in place (24 percent vs. 13 percent). This result, however, may be due to the fact that the companies reviewed in this size class tended to be somewhat smaller in the case of the random sample: the average number of drivers for these carriers was 3.9 for the random sample, compared to 8.1 for the SafeStat comparison group. Smaller companies with minimal management structure (particularly owner operators) may be more likely than larger companies to have no drug testing program in place.

Overall, 37 percent of the carriers reviewed in the SafeStat comparison group had at least one Part 382 violation. This compares to a population estimate of 58 percent for all motor carriers, based on the

Table 5.
Percentage of Carriers in SafeStat Comparison Group in Noncompliance with Part 382 by Size Class and Violation Type

Size Class of CDL Drivers	No. Reviews	At Least One Acute Violation	At Least One Critical Violation	No Program in Place	At Least One Violation
1–19	2,600	24%	22%	13%	40%
20–49	594	7%	26%	2%	29%
50–99	218	9%	24%	1%	28%
100–999	189	5%	22%	0%	24%
1000+	5	0%	20%	0%	20%
All Carriers	3,606	20%	22%	10%	37%

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Distribution
This Analysis Brief is being distributed according to a standard distribution. Direct distribution is being made to the Resource Centers and Divisions.

Availability
This Analysis Brief is available from the Office of Data Analysis and Information Systems, Telephone: (202) 366-1861.

Key Words
motor carriers, CDL drivers, controlled substance and alcohol testing programs, random sample survey, compliance review, acute violations, critical violations.

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random sample (**Table 3**), and a population estimate of 44 percent for all motor carriers with nonzero CDL counts in the MCMIS file (**Table 4**). Since the 37 percent noncompliance rate for the SafeStat comparison group falls within the 34 to 54 percent confidence interval obtained from the random sample for the nonzero CDL population, this 7 percent difference between the results from the random survey and SafeStat cannot be shown to be statistically significant (i.e., from the limited data, the difference cannot be shown to be real, even if it is).

Since small carriers constitute a large fraction of the motor carrier population (and hence are weighted heavily by formula #1, above) and also have the highest noncompliance rates for Part 382, one would expect the population estimates of noncompliance based on the random sample to be higher than similar rates obtained from SafeStat. In fact, it is quite likely that in order to achieve anything close to a 44 percent noncompliance rate with carriers targeted by SafeStat, at least 90 percent of them would have to be conducted in the "1–19" size class.

Summary

Data on motor carrier compliance with Part 382 were collected from a stratified random sample of 345 carriers and compared with data collected from carriers targeted for review by SafeStat. Based on the stratified random sample, an estimated 32 percent of all motor carriers do not have a drug and alcohol testing program in place and 58 percent of all motor carriers are in violation of some aspect of Part 382. If the target population is limited to only those carriers with known CDL counts in MCMIS, the estimates become 23 and 44 percent, respectively. These estimates are "driven" by data from small carriers (19 or fewer CDL drivers), which dominate the industry. Owing to the limited sample size (345 carriers) used in this study, the confidence intervals around these estimates are rather wide, ranging between plus or minus 8 percent to plus or minus 10 percent.

In the SafeStat comparison group, 10 percent of all carriers had no drug and alcohol testing program in place and 37 percent of all carriers were in violation of at least some aspect of Part 382. The difference between this latter noncompliance rate of 37 percent and the 44 percent noncompliance rate from the random sample (for carriers with known CDL counts) cannot be shown to be statistically significant, given the limited size of the random sample.

Comparing results at the size-class level, one notes that the random sample has higher noncompliance rates in the smaller size classes, but that the SafeStat comparison has higher noncompliance rates in the larger size classes (50 or more drivers). The higher rates of noncompliance in the smaller size classes for the random sample may stem in part from the fact that motor carriers in the "1 to 19" size class tended to be smaller in the random sample than those selected by SafeStat.